

PROCEDURE F-6-1
(formerly referenced by 08-02)

**Procedures to Govern Separation
of Sewers and Watermains**

PROCEDURE F-6-1
PROCEDURES TO GOVERN THE SEPARATION
OF SEWERS AND WATERMAINS

1. Sewers/sewage works¹ and watermains located parallel to each other should be constructed in separate trenches maintaining a minimum clear horizontal separation distance of 2.5 metres.

In cases where it is not practical to maintain separate trenches or the recommended horizontal separation cannot be achieved, the Ministry of Environment and Energy or its designated "agent" may allow deviation from the above.

- 1.1 **Rationale** This is considered a good engineering and construction practice and will reduce the potential for health hazard in the event of the occurrence of conditions conducive to possible contaminated ground water flow into the water distribution system.
- 1.2 Contaminated ground and surface water may enter the water distribution system at leaks or breaks in piping, vacuum air relief valves, blowoffs, fire hydrants, meter sets, outlets, etc. with the occurrence of a negative internal or positive external pressure condition. Water pressure in a part of the system may be reduced to a potentially hazardous level due to shutdowns in the system, main breaks, heavy fire demand, high water usage, pumping, storage, or transmission deficiency.
- 1.3 It is recognized by the Ministry of Environment and Energy that health hazards may develop through relative locations of watermains and sewers. Adequate protection must be provided to prevent the occurrence of waterborne disease and chemical poisoning due to contaminated ground water and surface runoff entering the water distribution system.

2.0 Exceptions

Under unusual conditions, deviations from the "separate trench" requirement may be allowed but only in accordance with the Ministry of Environment and Energy guidelines for location of sewers and watermains set out as follows.

¹ Sewers/Sewage works includes sanitary sewers, sanitary forcemains, storm sewers, and storm forcemains, and all appurtenances/fittings thereto.

3.0 General

Ground or surface water may enter an opening in the water distribution system with the occurrence of a negative internal/positive external pressure condition. Ground water may enter the distribution system at leaks or breaks in piping, vacuum-air relief valves, blow-offs, fire hydrants, meter sets, outlets, etc. Water pressure in a part of the system may be reduced to a potentially hazardous level due to shut downs in the system, main breaks, heavy fire demand, high water usage, pumping, storage, or transmission deficiency.

The relative location of sewers and watermains (including appurtenances) and types of material used for each system are important considerations in designing a system to minimize the possibility of contaminants entering the water distribution system.

The use of, and adherence to, good engineering and construction practice will reduce the potential for health hazard in the event of the occurrence of conditions conducive to ground water flow into the water distribution system.

4.0 Parallel installations

Under normal conditions, watermains should be laid with at least 2.5 metres horizontal separation from any sewer or sewer manhole; the distance shall be measured from the nearest edges.

- a) Under unusual conditions, where a significant portion of the construction will be in rock, or where it is anticipated that severe dewatering problems will occur or where congestion with other utilities will prevent a clear horizontal separation of 2.5 metres, a watermain may be laid closer to a sewer, provided that the elevation of the crown of the sewer is at least 0.5 metres below the invert of the watermain. Such separation shall be of in-situ material or compacted backfill.
- b) Where this vertical separation cannot be obtained, the sewer shall be constructed of materials and with joints that are equivalent to watermain standards of construction and shall be pressure tested, in accordance with Division 701 of the OPSS (Ontario Provincial Standards Specification, published by Ontario Ministry of Transportation) at a pressure of 350 kPa, with no leakage.
- c) In rock trenches, facilities should be provided to permit drainage of the trench to minimize the effects of impounding of surface water and/or leakage from sewers in the trench.

5.0 Crossings

- 5.1 Under normal conditions, watermain shall cross above sewers with sufficient vertical separation to allow for proper bedding and structural support of the watermain and sewer main.
- 5.2 When it is not possible for the watermain to cross above the sewer, the watermain passing under a sewer shall be protected by providing:
- a) A vertical separation of at least 0.5 metres between the invert of the sewer and the crown of the watermain.
 - b) Adequate structural support for the sewers to prevent excessive deflection of joints and settling.
 - c) That the length of water pipe shall be centred at the point of crossing so that the joints will be equidistant and as far as possible from the sewer.

6.0 SERVICE CONNECTIONS

Wherever possible, the construction practices outlined in this guideline should apply with respect to sewer and water services.

7.0 TUNNEL CONSTRUCTION

If the "Tunnel" is of sufficient size to permit a man to enter the tunnel for the purposes of maintenance, etc., it is permissible to place the sewer and watermain through the tunnel providing the watermain is hung above the sewer.

If the tunnel is sized only to carry the pipes, or if the tunnel is subject to flooding, the sewer shall be constructed of materials and with joints that are equivalent to watermain standards of construction and shall be pressure tested, in accordance with Division 701 of the OPSS at a pressure of 350 kPa with no leakage.

8.0 DESIGN FACTORS

When local conditions do not permit the desired spacing, or water and sewer lines or other conditions indicate that detailed investigations are warranted, the following factors should be considered in the design of the environment and relative location of water and sewer lines.

This list of factors should be considered as a guide. The list is not all-inclusive.

- a) Materials, types of joints and identification for water and sewage pipes;
- b) Soil conditions, e.g. in-situ soil and backfilling materials and compaction techniques;
- c) Service and branch connections into the watermain and sewer lines;
- d) Compensating variations in the horizontal and vertical separations;
- e) Space for repair and alterations of water and sewer pipes;
- f) Off-setting of pipes around manholes;
- g) Location of ground-water table and trench drainage techniques;
- h) Other sanitary facilities such as septic tanks and tile fields, etc.

9.0

VALVE, AIR RELIEF, METER AND BLOW-OFF CHAMBERS

- a) Chambers or pits containing valves, blow-offs, meters or other such appurtenances to a water distribution system shall not be connected directly to any sanitary sewer, but may be connected to storm sewers provided that some means of back flow prevention is included.
- b) Blow-offs or air relief valves shall not be connected directly to any sewer.
- c) Such chambers or pits shall be drained to the surface of the ground where they are not subject to flooding by surface water; to absorption pits underground or to a sump within the chamber where ground water level is above the chamber floor.

10.0

POTABLE WATER RESERVOIRS BELOW NORMAL GROUND SURFACE AND WELL SUPPLIES

Sewers, drains, and similar sources of contamination should be kept at least 15 m from potable water reservoirs below normal ground surface and well supplies. Mechanical-jointed water pipes, pressure tested, in accordance with Division 701 of the OPSS at a pressure of 350 kPa with no leakage, may be used for gravity sewers at lesser separations.

11.0

UNACCEPTABLE INSTALLATIONS

No watermain or service line shall pass through or come into contact with any part of a sewer, sewer manhole and/or septic tank and tile field or similar sources of contamination.